

King Hill – C.J. Strike Reservoir Subbasin Assessment and Total Maximum Daily Load



**Revised
Final
March 2006**



Idaho Department of Environmental Quality

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Prepared by:
Boise Regional Office
Idaho Department of Environmental Quality
1445 N. Orchard
Boise Idaho 83642

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Abbreviations, Acronyms, and Symbols

§303(d)	Refers to section 303 subsection (d) of the Clean Water Act, or a list of impaired water bodies required by this section	DO	dissolved oxygen
μ	micro, one-one thousandth	DWS	domestic water supply
§	Section (usually a section of federal or state rules or statutes)	EPA	United States Environmental Protection Agency
AU	assessment unit	ESA	Endangered Species Act
AWS	agricultural water supply	F	Fahrenheit
BLM	United States Bureau of Land Management	HUC	Hydrologic Unit Code
BMP	best management practice	IDAPA	Refers to citations of Idaho administrative rules
BURP	Beneficial Use Reconnaissance Program	IDWR	Idaho Department of Water Resources
C	Celsius	LA	load allocation
CFR	Code of Federal Regulations (refers to citations in the federal administrative rules)	LC	load capacity
cfs	cubic feet per second	m	meter
CWA	Clean Water Act	mi	mile
CWAL	cold water aquatic life	mi²	square miles
DEQ	Department of Environmental Quality	MGD	million gallons per day
		mg/L	milligrams per liter
		mm	millimeter
		MOS	margin of safety
		n.a.	not applicable

NA	not assessed	WBAG	<i>Water Body Assessment Guidance</i>
NB	natural background		
nd	no data (data not available)	WLA	wasteload allocation
NPDES	National Pollutant Discharge Elimination System	WQS	water quality standard
NRCS	Natural Resources Conservation Service		
NTU	nephelometric turbidity unit		
PCR	primary contact recreation		
POR	period of record		
QA	quality assurance		
QC	quality control		
SBA	subbasin assessment		
SCR	secondary contact recreation		
SMI	DEQ's Stream Macroinvertebrate Index		
SOD	sediment oxygen demand		
SSC	suspended sediment concentration		
SS	salmonid (trout) spawning		
TDG	total dissolved gas		
TMDL	total maximum daily load		
TP	total phosphorus		
USGS	United States Geological Survey		
WAG	Watershed Advisory Group		

Executive Summary

The federal Clean Water Act (CWA) requires that states and tribes restore and maintain the chemical, physical, and biological integrity of the nation's waters. States and tribes, pursuant to Section 303 of the CWA, are to adopt water quality standards necessary to protect fish, shellfish, and wildlife while providing for recreation in and on the nation's waters whenever possible. Section 303(d) of the CWA establishes requirements for states and tribes to identify and prioritize water bodies that are water quality limited (i.e., water bodies that do not meet water quality standards). States and tribes must periodically publish a priority list (a "§303(d) list") of impaired waters. Currently this list must be published every two years. For waters identified on this list, states and tribes must develop a total maximum daily load (TMDL) for the pollutants, set at a level to achieve water quality standards.

This document addresses the water bodies in the King Hill-C.J. Strike Reservoir Subbasin that have been placed on Idaho's current §303(d) list.

This subbasin assessment (SBA) and TMDL analysis have been developed to comply with Idaho's TMDL schedule. The assessment describes the physical, biological, and cultural setting; water quality status; pollutant sources; and recent pollution control actions in the King Hill-C.J. Strike Reservoir Subbasin, located near Mountain Home, Idaho.

The first part of this document, the SBA, is an important first step in leading to the TMDL. The starting point for this assessment was Idaho's current §303(d) list of water quality limited water bodies. Ten segments of the King Hill-C.J. Strike Reservoir Subbasin were listed on this list. The SBA examines the current status of §303(d) listed waters and defines the extent of impairment and causes of water quality limitation throughout the subbasin. The TMDL analysis quantifies pollutant sources and allocates responsibility for load reductions needed to return listed waters to a condition of meeting water quality standards.

Subbasin at a Glance

Table A shows the §303(d) listed water bodies within the King Hill-C.J. Strike watershed. Figure A shows the watershed boundaries and the location of each §303(d) listed water within the watershed.

Table A. 303(d)¹ Listed segments in the King Hill-C.J. Strike Reservoir Subbasin.

Water Body	Boundaries	Assessment Unit	303(d) Pollutants
Snake River	King Hill to C.J. Strike Reservoir	ID17050101S W005_07	Sediment
C.J. Strike Reservoir	Entire Reservoir	ID17050101S W001_02, 05, 06, 07	Nutrients, Pesticides
Alkali Creek	Headwaters to Snake River	ID17050101S W013_02, 03	Sediment
Bennett Creek	Headwaters to Snake River	ID17050101S W016_02, 03	Unknown
Browns Creek	Headwaters to Snake River	ID17050101S W003_02, 03, 04 ID17050101S W004_02, 03	Sediment
Cold Springs Creek	Ryegrass Creek to Snake River	ID17050101S W014_03	Unknown
Deadman Creek	Confluence of E. and W. Forks to Snake River	ID17050101S W008_02, 03	Sediment
Little Canyon Creek	Headwaters to Snake River	ID17050101S W012_02, 03, 03a	Sediment, Flow Alteration
Ryegrass Creek	Headwaters to Cold Springs Creek	ID17050101S W015_02	Sediment
Sailor Creek	Headwaters to Snake River	ID17050101S W006_02, 03, 04	Sediment

¹Refers to a list created by the State of Idaho (using monitoring data) in 1998 or water bodies in Idaho that did not fully support at least one beneficial use. This list is required under section 303 subsection “d” of the Clean Water Act.

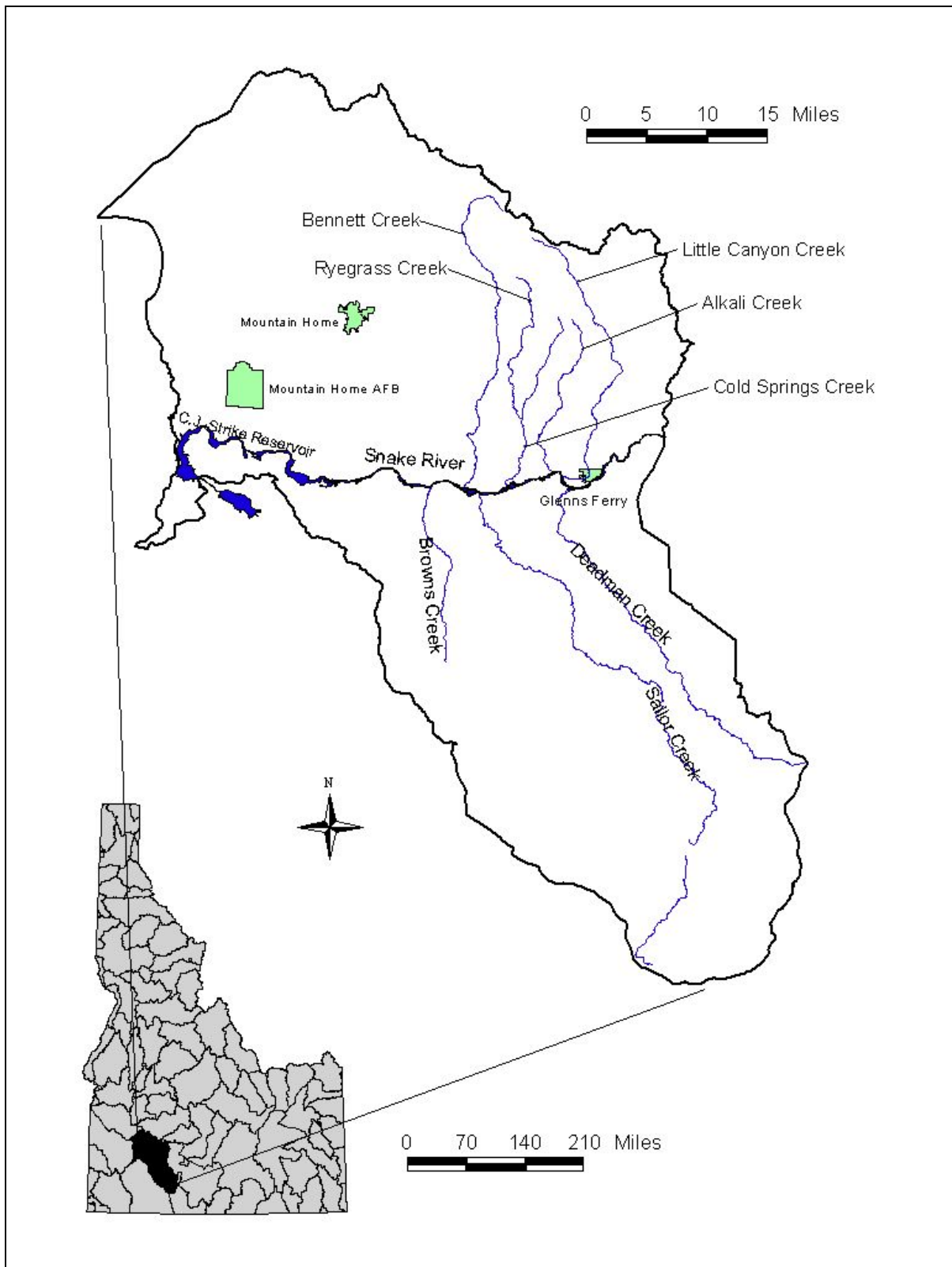


Figure A. §303(d) listed waters in HUC 17050101

Key Findings

Nutrient loading to the Snake River comes primarily from the upstream segment of the Snake River. Other smaller sources include several tributaries and the Glenns Ferry Wastewater Treatment Plant. The primary nutrient impairing beneficial uses in the river is phosphorus. A total phosphorus target of 0.075 milligrams per liter (mg/L) was established for the Snake River between King Hill and C.J. Strike Reservoir. A nutrient TMDL was developed based on meeting this target.

As with nutrients, sediment loading to the Snake River comes primarily from the upstream segment of the Snake River. However, the Snake River between King Hill and C.J. Strike Reservoir does not currently exceed the surrogate water column targets of 50 mg/L (for no longer than 60 days) and 80 mg/L (for no longer than 14 days). Even with the lack of exceedances, a sediment TMDL was established for the Snake River between King Hill and C.J. Strike Reservoir. The intent of the TMDL is to help address a sediment bedload problem in the river, which is contributing to excessive aquatic plant growth.

In-stream channel erosion is the primary source of sediment loading in Little Canyon Creek and Cold Springs Creek. Land management practices contribute to unstable banks in many areas, and the resulting instability has led to sediment delivery to the stream channel. Eighty-percent bank stability was selected as a surrogate target to achieve less than 30% fine material in the stream substrate. TMDLs were developed based on achieving 80% bank stability.

The Snake River arm of C.J. Strike Reservoir currently experiences dissolved oxygen sags in the metalimnion—the middle layer of a thermally stratified water body. These sags occur due to a variety of factors, namely decaying organic matter, including macrophytes, and excess total phosphorus in the water column and increasing sediment oxygen demand (SOD).

Using the CE-QUAL-W2 water quality model, dissolved oxygen conditions in the reservoir were simulated when a water column target of 0.075 mg/L total phosphorus (TP) and 6.0 mg/L dissolved oxygen were met in the Snake River and a SOD of $0.1 \text{ gm}^{-2} \text{ day}^{-1}$ was met in the reservoir. This SOD level is considered a long-term goal. The results showed that the dissolved oxygen criterion (6.0 mg/L) was nearly met in the reservoir. An additional 2.2 tons/year of oxygen is necessary in the metalimnion.

A nutrient TMDL based on the reservoir inflows meeting less than or equal to 0.075 mg/L TP was established for the reservoir. An additional dissolved oxygen load allocation of 2.2 tons/year was also assigned.

Table B summarizes the outcomes of the subbasin assessment and includes those streams for which TMDLs were developed.

Table B. Summary of subbasin assessment outcomes.

Water Body	§303(d) Pollutant	TMDL(s) Completed	Recommended Changes to §303(d) List
Snake River ID17050101SW005_07	Sediment	Sediment, Nutrients	None
C.J. Strike Reservoir ID17050101SW001_02, 05, 06, 07	Pesticides, Nutrients	Nutrients, Dissolved Oxygen	De-list Pesticides
Alkali Creek ID17050101SW013_02, 03	Sediment	None	De-list Sediment
Bennett Creek ID17050101SW016_02, 03	Unknown	None	De-list Unknown
Browns Creek ID17050101SW003_02, 03, 04 ID17050101SW004_02, 03	Sediment	None	De-list Sediment
Cold Springs Creek ID17050101SW014_03	Unknown	Sediment	None
Deadman Creek ID17050101SW008_02, 03	Sediment	None	De-list Sediment
Little Canyon Creek ID17050101SW012_02, 03, 03a	Sediment, Flow Alteration	Sediment	No Action for Flow Alteration
Ryegrass Creek ID17050101SW015_02	Sediment	None	De-list Sediment
Sailor Creek ID17050101SW006_02, 03, 04	Sediment	None	De-list Sediment

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